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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/750,488	12/31/2003	Eric C. Hannah	P18191	1800

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EXAMINER	
LE, THAO X	

ART UNIT	PAPER NUMBER
2814	

MAIL DATE	DELIVERY MODE
11/01/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/750,488	HANNAH ET AL.	
	Examiner	Art Unit	
	Thao X. Le	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,13-22,29-32,38,40 and 49-51* is/are pending in the application.

4a) Of the above claim(s) *13-22,29-32,38 and 40* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☒ Claim(s) *49-51* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's election without traverse of claims 1-6 and 49-51 in the reply filed on 31 Aug. 2007 is acknowledged.

2. The Applicant also argues that claims 13, 15, 30, 39 and 40 are linking claim. This is not persuasive because the species as claimed are mutually exclusive.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-3, 6, are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2004/0125565 to Chen et al in view of US 7,060,224 B2 to Edman et al. of record

Regarding claim 1, Chen et al discloses in Fig. 1, an apparatus comprising: a thermal management device [50]; a heat source [30]; and an interface [40] disposed

between the thermal management device [50] and the heat source [30], the interface having a plurality of nanostructures [paragraph 0019] the nanostructures having plurality of polymer molecules [paragraph 0019].

But Chen fails to disclose the nanostructure including polymer molecules deoxyribonucleic acid (DNA) molecules.

However, Edman et al teaches nanostructure including polymer molecules deoxyribonucleic acid (DNA), col. 26 line26. It would have been obvious to one of ordinary skilled in the art at the time of the invention was made to incorporate the nanostructure including polymer molecules deoxyribonucleic acid (DNA) teaching Edman in Chen's device at least to selectively glue together semiconductor parts with high precision and low cost as taught by Edman, col. 26 lines 25-35.

Regarding claims 2 and 3, Chen et al discloses thermal management device [50] comprises a passive cooling device and passive cooling device comprises at least one of a heat sink, a heat spreader, heat pipes and a heat slug [paragraph 0018].

Regarding claim 6, Chen discloses that the heat source [30] comprises a rectangular piece of silicon material [CPU] [paragraph 0004].

5. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al (US 2004/0125565 A1) and Edman et al (US 7,060,224 B2) as applied to claim 1 above and further in view of US 2005/0059238 to Chen et al. herein after Chen(2005) of record.

Regarding claims 4 and 5, Chen et al and Edman et al met all the claimed limitations except, the thermal management device comprises an active cooling device,

and the active cooling device comprises at least one of an air jet impingement device and a dielectric liquid device.

However, Chen (005) teaches thermal management device being air jet impingement device [micro-fan device, micropumps] [0039] and the active cooling device can be substituted for a passive cooling device Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to use active cooling device instead of passive cooling device to increase the efficiency of the thermal management device.

Allowable Subject Matter

6. Claims 49-51 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art of record neither anticipates nor renders obvious the limitation of claim 49 including the plurality of nanostructures include first nanostructures attached to the thermal management device, and second nanostructures attached to the heat source, wherein the first nanostructures include protrusions, wherein the second nanostructures include recesses, wherein the recesses are disposed in a pattern to receive the protrusions of the first nanostructures, and wherein the molecules are to facilitate adhesion of the first and second nanostructures to each other.

Response to Arguments

7. Applicant's arguments filed 29 May 2009 have been fully considered but they are not persuasive. The Applicant argues that Edman does not mention anything about an

interface disposed between a thermal management device and a heat source, thus there is no suggestion in Chen (2004) and Adman to combine in order to achieve the claimed invention. The Examiner respectfully submits that the Applicant argues against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In addition, the nanostructure including DNA polymer as taught by Edman is a glue or adhesive material to attach a semiconductor structure that can be incorporated into the thermal interface 40 of Chen (2004) as discussed above that does not change the principle of operation of the primary reference or render the reference inoperable for its intended purpose. See MPEP § 2143.01.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao X. Le whose telephone number is (571) 272-1708. The examiner can normally be reached on M-F from 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy can be reached on (571) 272 -1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

31 Oct. 2007

/Thao X Le/
Primary Examiner, Art Unit 2814